WHAT IS CLAIMED IS:

1. A sterilization system that applies low frequency power to a plasma within a vacuum chamber to remove gas or vapor species from an article, the low frequency power having a frequency less than or equal to approximately 200 kHz, the sterilization system comprising:

a switching module adapted to pulsate the low frequency power applied to the plasma;

a low frequency power feedback control system for controllably adjusting the low frequency power applied to the plasma, the low frequency power feedback control system comprising:

a power monitor adapted to produce a first signal indicative of the low frequency power applied to the plasma within the vacuum chamber;

a power control module adapted to produce a second signal in response to the first signal from the power monitor; and

a power controller adapted to adjust, in response to the second signal, the low frequency power applied to the plasma to maintain a substantially stable average low frequency power applied to the plasma while the article is being processed.

2. The sterilization system as described in Claim 1, wherein the switching module utilizes unipolar switching to pulsate the low frequency power applied to the plasma.

3. The sterilization system as described in Claim 1, wherein the switching module utilizes bipolar switching to pulsate the low frequency power applied to the plasma.

4. The sterilization system as described in Claim 1, wherein the switching module is further adapted to adjust pulse widths of the low frequency power applied to the plasma in response to signals from the power control module, thereby controlling the average low frequency power applied to the plasma.

5. The sterilization system as described in Claim 1, wherein the switching module is further adapted to adjust times between pulses of the low frequency power

applied to the plasma in response to signals from the power control module, thereby controlling the average low frequency power applied to the plasma.

6. The sterilization system as described in Claim 1, wherein the low frequency power feedback control system further comprises a current monitor that is adapted to produce a third signal indicative of a current applied to the plasma, and a voltage monitor that is adapted to produce a fourth signal indicative of a voltage applied across the plasma.

7. The sterilization system as described in Claim 6, wherein the power monitor is adapted to produce the first signal in response to the third signal and the fourth signal.

8. The sterilization system as described in Claim 6, wherein the current monitor comprises a current sensor, a first converter, and a first voltage amplifier.

9. The sterilization system as described in Claim 8, wherein the current monitor further comprises an over-current detector coupled to the power control module.

10. The sterilization system as described in Claim 6, wherein the voltage monitor comprises a step-down transformer, a second converter, and a second voltage amplifier.

11. The sterilization system as described in Claim 1, wherein the power control module comprises a power control processor.

12. The sterilization system as described in Claim 11, wherein the power control module further comprises a fault detector.

13. The sterilization system as described in Claim 12, wherein the fault detector is selected from the group consisting of an over-power detector and a thermal switch.

14. The sterilization system as described in Claim 11, wherein the power control processor is coupled to the power controller, the power monitor, and the current monitor.

15. The sterilization system as described in Claim 1, wherein the power control module is coupled to a user interface adapted to receive user input and to transmit the user input to the power control module.

16. The sterilization system as described in Claim 1, wherein the power controller is adapted to adjust a duty cycle of the low frequency power applied to the plasma in response to the second signal from the power control module.

17. The sterilization system as described in Claim 1, wherein the power controller is adapted to adjust an amplitude of the low frequency power applied to the plasma in response to the second signal from the power control module.

18. The sterilization system as described in Claim 1, wherein the low frequency power has a frequency less than or equal to approximately 200 kHz .

19. The sterilization system as described in Claim 1, wherein the low frequency power has a frequency from approximately 1 kHz to approximately 100 kHz.

20. A method of controllably adjusting a low frequency power applied to a plasma within a vacuum chamber of a sterilization system to remove gas or vapor species from an article, the low frequency power having a frequency less than or equal to approximately 200 kHz, the method comprising:

pulsating the low frequency power applied to the plasma;

monitoring the low frequency power applied to the plasma within the vacuum chamber;

generating a first signal indicative of the low frequency power applied to the plasma; and

adjusting the low frequency power applied to the plasma in response to the first signal to maintain a substantially stable average low frequency power applied to the plasma while the article is being processed.

21. The method as described in Claim 20, wherein the pulsating of the low frequency power applied to the plasma is unipolar.

22. The method as described in Claim 20, wherein the pulsating of the low frequency power applied to the plasma is bipolar.

23. The method as described in Claim 20, wherein the adjusting of the low frequency power applied to the plasma comprises adjusting pulse widths of the low frequency power applied to the plasma.

24. The method as described in Claim 20, wherein the adjusting of the low frequency power applied to the plasma comprises adjusting times between pulses of the low frequency power applied to the plasma.

25. The method as described in Claim 20, wherein the monitoring of the low frequency power applied to the plasma comprises:

monitoring a current applied to the plasma and generating a second signal indicative of the current; and

monitoring a voltage applied across the plasma and generating a third signal indicative of the voltage.

26. The method as described in Claim 25, wherein the generating of the first signal is in response to the second signal and the third signal.

27. The method as described in Claim 20, wherein the adjusting of the low frequency power applied to the plasma comprises adjusting a duty cycle of the low frequency power applied to the plasma.

28. The method as described in Claim 20, wherein the adjusting of the low frequency power applied to the plasma comprises adjusting an amplitude of the low frequency power applied to the plasma.

29. The method as described in Claim 20, wherein the low frequency power has a frequency less than or equal to approximately 200 kHz.

30. The method as described in Claim 20, wherein the low frequency power has a frequency from approximately 1 kHz to approximately 100 kHz.